

Head & Spine

A thick, horizontal yellow brushstroke that spans the width of the slide, positioned directly below the title text.

Overview



- Nervous System Review
- Skeletal System
- Injuries to The Spine
- Injuries to The Brain & Skull
- Immobilization
- Special Considerations

Nervous System Review



□ Components

- Central nervous
- Peripheral nervous system
- Autonomic nervous system

□ Actions

Skeletal System



- Functions

- Components

 - Skull

 - Spinal Column

 - | 33 bones

 - Surrounds and protects the spinal cord

Injuries to The Spine



□ Mechanism of injury

■ Compression

□ Falls

□ Diving accidents

□ Motor vehicle accidents

■ Excessive flexion, extension, rotation

■ Lateral bending

Injuries to The Spine



- Mechanism of injury

- Distraction

- Pulling apart of the spine

- Hangings

Injuries to The Spine



- Maintain a high index of suspicion
 - | Motor vehicle crashes
 - pedestrian-vehicle collisions
 - Falls
 - Blunt trauma
 - Penetrating trauma to head, neck, or torso
 - Motorcycle crashes
 - Hangings
 - Diving accidents
 - Unconscious trauma victims

Injuries to The Spine



□ Signs & symptoms

- Ability to walk, move, extremities or feel sensation; or lack of pain to spinal column does not rule out the possibility of spinal column or cord damage
- Tenderness in the area of injury

Injuries to The Spine



□ Signs & symptoms

■ Pain associated with moving

□ Do not ask the patient to move to try to elicit a pain response

□ Do not move the patient to test for a pain response

■ Tell the patient not to move while asking questions

Injuries to The Spine



□ Signs & symptoms

- Pain independent of movement or palpation
 - Along spinal column
 - Lower legs
 - May be intermittent
- Obvious deformity of the spine upon palpation

Injuries to The Spine



□ Signs & symptoms

■ Soft tissue injuries associated with trauma

□ Head and neck to cervical spine

□ Shoulders, back, or abdomen-thoracic
lumbar

□ Lower extremities-lumbar, sacral

■ Numbness, weakness or tingling in the extremities

Injuries to The Spine



□ Signs & symptoms

- Loss of sensation or paralysis below the suspected level of injury
- Loss of sensation or paralysis in the upper or lower extremities
- Incontinence

Injuries to The Spine



▢ Assessing the potential spine injured pt

■ Responsive patient

▢ Mechanism of injury

▢ Questions to ask

- Does your neck or back hurt?
- What happened?
- Where does it hurt?
- Can you move your hands and feet?
- Can you feel me touching your fingers?
- Can you feel me touching your toes?

Injuries to The Spine



- Assessing the potential spine injured pt
 - Responsive patient
 - | Inspect for contusions, deformities, lacerations, punctures, penetrations, swelling
 - Palpate for areas of tenderness or deformity
 - Assess equality of strength of extremities
 - Hand grip
 - Gently push feet against hands

Injuries to The Spine



- Assessing the potential spine injured pt
 - Unresponsive patient
 - Mechanism of injury
 - Initial assessment
 - Inspect for:
 - Contusions
 - Deformities
 - Lacerations
 - Punctures/penetrations
 - Swelling

Injuries to The Spine



- ▢ Assessing the potential spine injured pt
 - Unresponsive patient
 - ▢ Palpate for areas of tenderness or deformity
 - ▢ Obtain information from others at the scene to determine information relevant to mechanism of injury or patient mental status prior to the EMT-Basic's arrival

Injuries to The Spine



- Complications
 - Inadequate breathing effort
 - Paralysis

Injuries to The Spine

Emergency medical care

- Body substance isolation
- Establish & maintain in-line immobilization
 - Place the head in a neutral in-line position unless the patient complains of pain or the head is not easily moved into position
 - Place head in alignment with spine
 - Maintain constant manual in-line immobilization until the patient is properly secured to a backboard with the head immobilized

Injuries to The Spine



- Emergency medical care
 - Perform initial assessment
 - Whenever possible, airway control must be done with in-line immobilization
 - Whenever possible, artificial ventilation must be done with in-line immobilization
 - assess pulse, motor & sensation in all extremities
 - Assess the cervical region and neck

Injuries to The Spine



□ Emergency medical care

■ Apply a rigid, cervical immobilization device

- Properly size the cervical immobilization device - if it doesn't fit use a rolled towel & tape to the board and have rescuer hold the head manually
- An improperly fit immobilization device will do more harm than good

Injuries to The Spine



□ Emergency medical care

- If found in a lying position, immobilize the patient to a long spine board

- Position the device

- Move the patient onto the device by log rolling

- One EMT-B must maintain in-line immobilization of the head and spine
- EMT-B at the head directs the movement of the patient

Injuries to The Spine



□ Emergency medical care

- One to three other EMT-Bs control the movement of the rest of the body
- Quickly assess posterior body if not already done in focused history & physical exam
- Position the long spine board under the patient

Injuries to The Spine



□ Emergency medical care

- Place patient onto the board at the command of the EMT-B holding in-line immobilization
- Using a slide, proper lift, log roll or scoop stretcher so as to limit movement to the minimum amount possible
- Which method to use must be decided based upon the situation, scene and available resources

Injuries to The Spine



□ Emergency medical care

□ Pad voids between the patient and the board

- Adult
 - Under the head
 - Voids under torso - be careful of extra movement
- Infant & child - pad under the shoulders to the toes to establish a neutral position

□ Immobilize torso to the board

Injuries to The Spine



□ Emergency medical care

- Immobilize the patient's head to the board
- Secure the legs to the board
- Reassess pulses, motor and sensation and record

Injuries to The Spine



■ Emergency medical care

- If the patient is found in a sitting position in a chair, immobilize with a short spine immobilization device
- Exception: if the patient must be removed urgently because of his injuries, the need to gain access to others, or dangers at the scene
- He must then be lowered directly onto a long board & removed with manual immobilization provided

Injuries to The Spine



■ Emergency medical care

- | Position device behind the patient
- Secure the device to the patient's torso
- Evaluate torso fixation & adjust as necessary without excessive movement of the patient
- Evaluate & pad behind the patient's head as necessary to maintain neutral in-line immobilization

Injuries to The Spine



□ Emergency medical care

- Secure the patient's head to the device
- Insert a long board under the patient's buttocks and rotate and lower him to it - If not possible, lower him to the long spine board
- Reassess pulses, motor and sensory in all extremities and record

Injuries to The Spine



□ Emergency medical care

- If the patient is found in a standing position, immobilize the patient to a long spine board

- Position the device behind patient

- Move the patient onto the device by:

- One rescuer on each side of the patient, one additional rescuer at the foot facing the patient

Injuries to The Spine



□ Emergency medical care

- The rescuers on both sides of the patient reach with the hand closest to the patient under the arm to grasp the board, and use the hand farthest from the patient to secure the head
- Once the position is assured, they place the leg closest to the board behind the board and begin to tip the top backward - the rescuer at the foot of the board secures the board and the patient to prevent them from sliding, and the board is brought into a level horizontal position

Injuries to The Spine



□ Emergency medical car

- If the patient is critically injured, perform a rapid extrication
- Transport the patient immediately
 - bring body into alignment
 - Transfer to long board without short spine board

Injuries to the Brain & Skull



□ Head injuries

■ Injuries to scalp

- Very vascular, may bleed more than expected

- Control bleeding with direct pressure

■ Injury to the brain - injury of brain tissue or bleeding into the skull will cause an increase of pressure in the skull

Injuries to the Brain & Skull



- Related non-traumatic conditions
 - Non-traumatic injuries to the brain may occur due to clots or hemorrhaging
 - Non-traumatic brain injuries can be a cause of altered mental status
 - Signs & symptoms parallel that of traumatic injuries with the exception of evidence of trauma and a lack of mechanism of injury

Injuries to the Brain & Skull



- Skull injury - Signs & symptoms
 - Mechanism of trauma
 - Contusions, lacerations, hematomas to the scalp
 - Deformity to the skull
 - Blood or fluid leakage from the ears or nose
 - Bruising around the eyes
 - Bruising behind the ears

Injuries to the Brain & Skull



□ Head injury

■ Traumatic

■ Signs & symptoms

□ Altered or decreasing mental status is the best indicator of a brain injury

- Confusion, disorientation, or repetitive questioning
- Conscious - deteriorating mental status
- Unresponsive

Injuries to the Brain & Skull



■ Head injury

■ S&S

- | Irregular breathing pattern
- Consideration of mechanism injury
 - Deformity of window shield
 - Deformity of helmet
- Contusions, lacerations, hematomas to the scalp
- Deformity to the skull
- Blood or fluid leakage from the ears and nose

Injuries to the Brain & Skull



□ Head injury

■ S&S

- Bruising around the eyes
- Bruising behind the ears
- Neurologic disability
- Nausea and/or vomiting
- Unequal pupil size with altered mental status
- Seizure activity may be seen

Injuries to the Brain & Skull



■ Open head injury

■ Signs & symptoms

■ Consideration of mechanism of injury

- Deformity of window shield
- Deformity of helmet

■ Contusions, lacerations, hematomas to the scalp

□ Deformity to the skull

□ Penetrating injury - do not remove impaled objects in the skull

Injuries to the Brain & Skull

■ Open head injury

■ S&S

- | Soft area or depression upon palpation
- Exposed brain tissue if open
- Bleeding from the open bone injury
- Blood or fluid leakage from the ears and nose

Injuries to the Brain & Skull



□ Open head injury

■ S&S

- Bruising around the eyes
- Bruising behind the ears
- Nausea and/or vomiting
- Possible S&S of a closed head injury may exist if brain injury has occurred

Injuries to the Brain & Skull



- Emergency medical care
 - Body substance isolation
 - Maintain airway/artificial ventilation/oxygenation
 - Initial assessment with spinal immobilization should be done on scene with a complete detailed physical exam en route

Injuries to the Brain & Skull



■ Emergency medical care

- With any head injury, the EMT-B must suspect spinal injury - immobilize the spine
- Closely monitor the airway, breathing, pulse, and mental status for deterioration
- Control bleeding
 - Do not apply pressure to an open or depressed skull injury
 - Dress & bandage open wound as indicated in the treatment of soft tissue injuries

Injuries to the Brain & Skull



- Emergency medical care
 - If a medical injury or non-traumatic injury exist, place patient on the left side
 - Be prepared for changes in patient condition
 - Immediately transport the patient

Immobilization



□ Cervical spine immobilization devices

■ Indications

- Any suspected injury to the spine based on mechanism of injury, history or S&S
- use in conjunction with short and long back boards

Immobilization



□ Cervical spine immobilization devices

■ Sizing

- Various types of rigid cervical immobilization devices exist, therefore, sizing is based on the specific design of the device
- An improperly sized immobilization device has a potential for further injury

Immobilization



■ Cervical spine immobilization devices

■ Sizing

- | Do not obstruct the airway with the placement of a cervical immobilization device
- If it doesn't fit use a rolled towel and tape to the board and manually support the head - an improperly fit device will do more harm than good

Immobilization



□ Cervical spine immobilization devices

■ Precautions

- Cervical immobilization devices alone do not provide adequate in-line immobilization
- Manual immobilization must always be used with a cervical immobilization device until the head is secured to a board

Immobilization

□ Short backboards

- Several different types of short board immobilization devices exist
 - Vest type devices
 - Rigid short board
- Provides stabilization & immobilization to the head, neck, and torso
- Used to immobilize non-critical sitting patients with suspected spinal injuries

Immobilization



□ Short backboards

■ General application

- Start manual in-line immobilization
- Assess pulses, motor & sensory function in all extremities
- Assess the cervical area
- Apply a cervical immobilization device
- Position short board immobilization device behind the patient

Immobilization



▢ Short backboards

■ General application

- ▢ Secure the device to the patient's torso
- ▢ Evaluate torso & groin fixation and adjust as necessary without excessive movement of the patient
- ▢ Evaluate and pad behind the patient's head as necessary to maintain neutral in-line immobilization

Immobilization



▢ Short backboards

■ General application

- ▢ Secure the patient's head to the device
- ▢ Release manual immobilization of head
- ▢ Rotate or lift the patient to the long spine board
- ▢ Immobilize patient to long spine board
- ▢ Reassess pulses, motor & sensory function in all extremities

Immobilization



■ Long backboards

- Several different types of long board immobilization devices exist
- Provide stabilization and immobilization to the head, neck and torso, pelvis and extremities
- Used to immobilize patients found in a lying, standing, or sitting position
- Sometimes used in conjunction with short backboard

Immobilization



□ Long backboards

■ General application

- Start manual in-line immobilization
- Assess pulses, motor & sensory function in all extremities
- Assess the cervical area
- Apply a cervical immobilization device
- Position the device

Immobilization



□ Long backboards

■ General application

- Move the patient onto the device by log roll, suitable lift or slide, or scoop stretcher - a log roll is:
 - One EMT-B must maintain in-line immobilization
 - EMT-B at the head directs the movement of the patient

Immobilization



■ Long backboards

- One to three other EMT-Bs control the movement of the rest of the body
- Quickly assess posterior body if not already done in initial assessment
- Position the long spine board under the patient
- Roll patient onto the board at the command of the EMT-B holding in-line immobilization

Immobilization



□ Long backboards

| Pad voids between the patient and the board

- Adult
 - Under the head as needed
 - Under the torso as needed
- Infant & child - pad under the shoulders to the toes to establish a neutral position

Immobilization



□ Long backboards

- Immobilize torso to the board by applying straps across the chest and pelvis and adjust as needed
- Immobilize the patient's head to the board
- Fasten legs, proximal to and distal to the knees
- Reassess pulses, motor & sensation and record

Special Considerations

■ Rapid extrication

■ Indications

- Unsafe scene

- Unstable patient condition warrants immediate movement and transport

- Patient blocks the EMT-B's access to another, more seriously injured patient

- Rapid extrication is based on time and the patient, and not the EMT-B's preference

■ Procedure - refer to section on Lifting & Moving the Patient

Special Considerations



□ Helmet removal

■ Special assessment needs for patients wearing helmets

- Airway & breathing
- Fit of the helmet & patient's movement within the helmet
- Ability to gain access to airway & breathing

Special Considerations

□ Helmet removal

■ Indications for leaving the helmet

- Good fit with little or no movement of the patient's head within the helmet
- No impending airway or breathing problems
- Removal would cause further injury to the patient
- Proper spinal immobilization could be performed with helmet in place
- No interference with the EMT-B's ability to assess & reassess airway and breathing

Special Considerations



■ Helmet removal

- Indications for removing the helmet
 - Inability to assess and/or reassess airway and breathing
 - Restriction of adequate management of the airway or breathing
 - Improperly fitted helmet allowing for excessive patient head movement within the helmet
 - Proper spinal immobilization cannot be performed due to helmet
 - Cardiac arrest

Special Considerations



□ Helmet removal

■ Types of helmets

□ Sports

- Typically open anteriorly
- Easier access to airway

□ Motorcycle

- Full face
- Shield

□ Other

Special Considerations



■ Helmet removal

■ General rules for removal

- | The technique for removal of a helmet depends on the actual type of helmet worn by the patient
- take eyeglasses off before removal of the helmet
- One EMT-B stabilizes the helmet by placing his hands on each side of the helmet with the fingers on the mandible to prevent movement

Special Considerations



□ Helmet removal

■ General rules for removal

- Second EMT-B loosens the strap
- The second EMT-B places one hand on the mandible at the angle of the jaw and the other hand posteriorly at the occipital region
- The EMT-B holding the helmet pulls the sides of the helmet apart and gently slips the helmet halfway off the patient's head then stops

Special Considerations



□ Helmet removal

■ General rules for removal

- The EMT-B maintaining stabilization of the neck repositions, slides the posterior and superiorly to secure the head from falling back after complete helmet removal
- The helmet is removed completely
- The EMT-B then can proceed with spinal immobilization as indicated in the spinal immobilization section

Special Considerations



- Infants & children
 - immobilize the infant or child on a rigid board appropriate for size, according to the procedure outline in the spinal immobilization section

Special Considerations



▢ Infants & children

■ Special considerations

- ▢ Pad from the shoulders to the heels of the infant or child, if necessary to maintain neutral immobilization
- ▢ Properly size the cervical immobilization device
 - If it doesn't fit, use a rolled towel & tape to the board and manually support head
 - An improperly fit immobilization device will do more harm than good

Summary



- Nervous System Review
- Skeletal System
- Injuries to The Spine
- Injuries to The Brain & Skull
- Immobilization
- Special Considerations